APPENDIX A
Ergonomic Risk Factor Descriptions and Examples
[Non-Mandatory]

1. Ergonomic **risk factors** are characteristics of a job that contribute to the creation of ergonomic hazards that may negatively impact job performance including quality, productivity, as well as worker health. Section 'C' of the rule required that awareness training covers what are risk factors and how to recognize them.

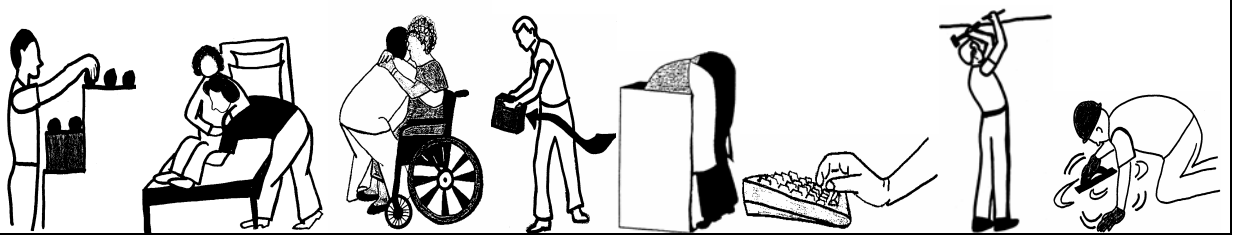
   Risk factors are present at varying levels for different jobs and tasks. Generally, the greater the exposure is to a single risk factor or combination of risk factors, the greater the probability of a musculoskeletal disorder. The mere presence of a risk factor does not necessarily mean that an employee performing a job is at undue risk of injury.

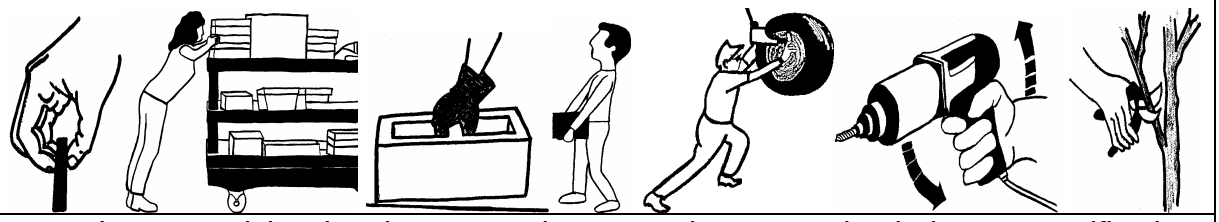
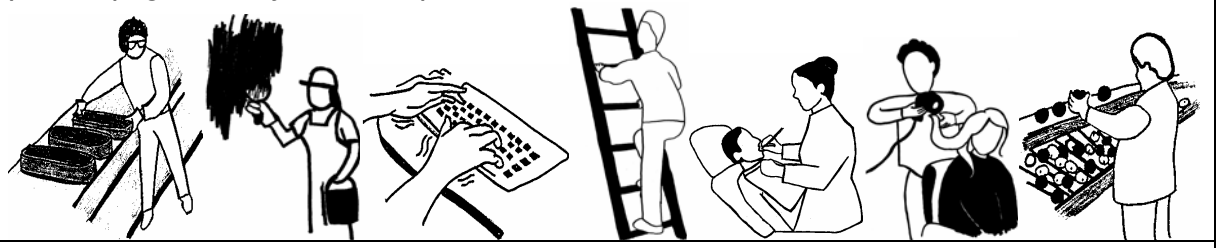
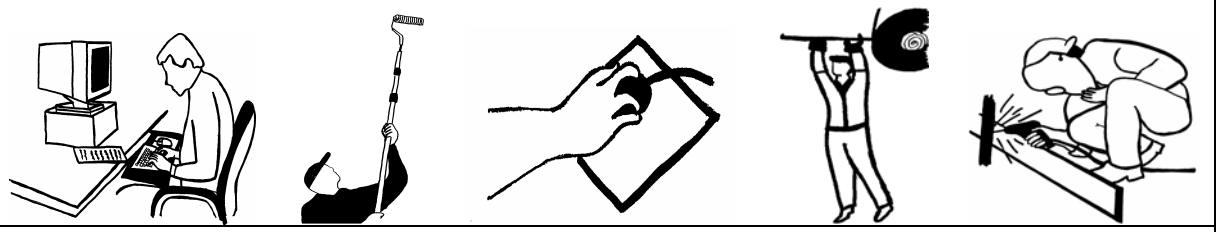
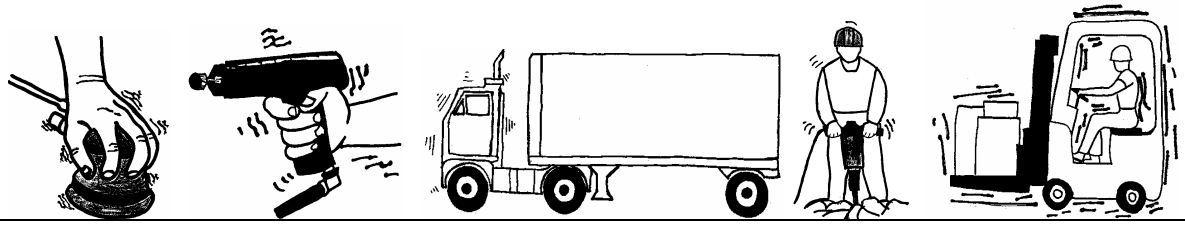
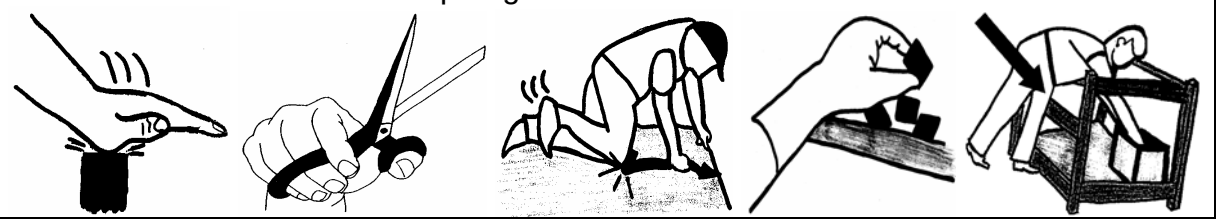
2. For job assessment of ergonomic risk factors consider the following, as described in table 1:
   a. Awkward postures and motions
   b. Forceful exertions
   c. Repetition
   d. Sustained exertions
   e. Vibration
   f. Contact stress
   g. Cold temperature

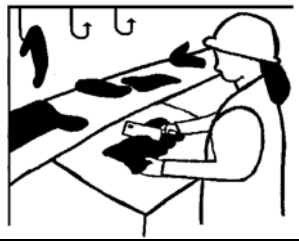
   Risk factors may be evaluated by the following exposure properties:
   h. Duration
   i. Recovery
   j. Magnitude

Table 1

Risk Factor Descriptions With Examples and Exposure Properties

a. Awkward Postures and Motions	Posture is the position your body is in that affects muscle groups and body parts involved in physical activity. Examples of awkward postures and motions include extended reaching, twisting, bending, kneeling, squatting, or working overhead. 

b. Forceful Exertions	Force is the amount of physical effort required to perform a task such as heavy lifting, or to maintain control of equipment or tools. The amount of force required to complete the task depends on the type of grip, the size, shape and weight of an object, posture, and the type of activity. Examples include tasks involving gripping, lifting, carrying, lowering, pushing, pulling, holding, assembling, connecting, using a hand tool, and maintaining control of a powered tool. 
c. Repetition	A motion or activity that is repeated over and over again during a specific time period (e.g. work cycle, shifts). 
d. Sustained Exertions	A body position that is maintained for an extended period of time. 
e. Vibration	The oscillatory motion of an object. Vibration can be described in terms of its frequency, acceleration, and direction of motion. Examples of exposure to vibration include: operating tools such as sanders, grinders, chippers, routers, drills, chain saws and other saws, jackhammers, or sitting/standing on vibrating surfaces such as driving a truck. 
f. Contact Stress	Resting or pressing body parts against a hard surface or sharp edge can result in compression of nerves, muscles, tendons, blood vessels and other tissues. Examples include: pounding with the palm of hand; tools digging into the palm of hand; tools digging into the sides of fingers; resting the knee, elbow, forearm, or wrist on a hard surface or sharp edge. 

g. Cold Temperature	Exposure to low temperatures that impacts the function of specific body parts, primarily hands and fingers. Examples of exposure to cold temperatures include: handling of frozen or refrigerated materials, cold environments, immersion of body parts in cold substances, or cold air exhaust.    
h. Duration	The amount of time a person is exposed to one or more risk factors.
i. Recovery	Periods of reduced exposure to risk factors. These may be rest breaks, pauses in work activity, or motions and exertions that provide specific body parts the opportunity to recuperate.
j. Magnitude	The amount of each risk factor involved. Examples include: the amount of force applied, the angle/position of the back or the repetition rate. **STILL UNDER DISCUSSION**

~~Assessment Resources~~

~~Ergonomic risk factors vary in magnitude, as above, for different jobs and tasks. Exposure to one or many risk factors could be present and should be considered. The assessment process required in Section "D" of the rule could begin by using Table 2 or by other methods of assessment, which may be found various recourses as provided in Table 3 below.~~

~~Table 2~~

~~Assessment Formula/Process~~

~~Awkward Postures & Motions~~	~~+~~	~~Forceful Exertions~~	~~+~~	~~Repetition Sustained Exertions~~	~~+~~	~~Vibration~~	~~+~~	~~Contact Stress~~	~~+~~	~~Cold Temperature~~	~~+~~	~~Duration~~	~~-~~	~~Recovery~~	~~=~~	~~Potential Ergonomic Hazard~~

~~Not all Ergonomic Risk Factors must be present to have a Potential Ergonomic Hazard~~

"Do I Have An Ergonomic Hazard?"
"How Do I Do An Assessment?"

The presence or absence of ergonomic hazards is made apparent during the ergonomic risk factor assessment process. Focusing on one task or work procedure, the presence or absence and exposure properties of the various potential ergonomic risk factors is evaluated (see Appendix A for a description of risk factors and exposure properties) during such an assessment. While there are various quantitative 'scoring' systems used to make conducting ergonomic risk factor assessments simpler and more consistent, the determination of the presence or absence of an ergonomic hazard is ultimately a judgment. The employer should choose assessment systems that fit their situation; type and complexity of operation, number of affected employees, and workplace musculoskeletal injury incidence history are all factors that will determine how simple or comprehensive an assessment system is needed. Examples of several types of ergonomic risk factor assessment processes are given at the MIOSHA CET website: to be determined

APPENDIX B
Process for Assessing and Responding to Ergonomic Risk Factors Descriptions and Resources
[Non-Mandatory]

In an effort to assist in the requirements of Section D of the rule which reads as follows:

Section D

Process for Assessing and Responding to Ergonomic Occupational Risk Factors.

(1) An employer shall establish and utilize an effective process that includes the following:

(a) Employee involvement.

To assist with this requirement, here are some examples of employee involvement may include:

i. Suggestion box.
ii. Employees involved in accident reviews.
iii. Joint Labor and Management Health and Safety committee.
iv. Union assistance.
v. Employee job self-assessment.
vi. Proactive sign and symptom reporting.
vii. Routine safety talks.
viii. Peer observation and intervention program.
ix. Employee wellness program

(b) Assessment of ergonomic occupational risk factors

To assist with this requirement, note the following suggestions:

i. Depending on the nature of your operations and work practices, ergonomic assessments range from simple to in-depth processes.
ii. Simple processes may include employee job self-assessment, health and safety committee review, contacting your workman's compensation/disability insurance company and/or safety consultants.
iii. In-depth processes may include: using NIOSH lifting equations, or other commercial assessment tools.

(c) Elimination, reduction, or control of ergonomic hazards where economically and technically feasible.

To assist with this requirement, note the following suggestions:

i. Examine the results of the assessments completed and identify opportunities to address the risk factors.

ii. **Engineering controls** could include but are not limited to examples such as lift assists, redesigning workstation layout or workflow redesign.

iii. **Administrative controls** could include but are not limited to examples such as job rotation, job enlargement, job work-rest cycle, training and focused re-training.

Control Example

Industry	Tasks	Example Risk Factor(s) [Section D (b)]	Example Engineering Controls	Example Administrative Controls
Health Care	Transferring Patients	Force and Awkward Posture	Use mechanical lift assists	Use multiple employees
Manufacturing	Pallet Loading	Force and Awkward Posture	Lift table or automatic palletizer	Reinforcement of safe lifting procedures
Office	Data Entry/ Word Processing	Contact Stress and Awkward Posture	Adjustable keyboard tray	Stretch breaks

(2) Employers with an effective ergonomic program established and documented by the effective date of these rules are exempt from the rules in this section.

To assist in this requirement, note the following suggestions.

i. If an employer can demonstrate they have established an ergonomic program that at a minimum has essentially accomplished the performance goals as outlined in the rules, then the employer has met the requirement of these rules.

Table 3

For further assistance in assessing risk factors, contact MIOSHA, OSHA, or NIOSH which are listed below; or your union or industry association.

State and Federal Assistance

MIOSHA Michigan Occupational Safety and Health Administration Consultation Education & Training Division (CET)	www.michigan.gov/cet Phone: 517.322.1856
OSHA Federal Occupational Safety and Health Administration	http://www.osha.gov/SLTC/ergonomics/index.html
NIOSH National Institute of Safety and Health	http://www.cdc.gov/niosh/topics/ergonomics/

Appendix C

[Non-Mandatory]

Signs and Symptoms

1. Musculoskeletal disorders by definition are disorders of muscles, nerves, tendons, ligaments, joints, cartilage or spinal discs. This definition reflects a gradual development of a condition, and not a condition that is the result of an instantaneous or one time event.

2. Any musculoskeletal disorder will be accompanied by one or all of the signs of inflammation in the acute or early stages. These can include warmth or heat, redness, swelling, pain, and loss of function. The location of these signs will vary depending on several factors such as the tissue involved, the degree of involvement and the chronicity. **[Needs a common phase]**

3. Initially, the individual will experience a feeling of fatigue or ache that does not resolve before the next workday. This should be the first indication that an ergonomic hazard is present and a work site evaluation may be indicated.

4. As time passes, the seriousness of the condition will most likely increase, especially if left untreated. The early signs of inflammation can progress to more chronic signs such as crepitus (creaking or grinding sounds in a joint), numbness, tingling, weakness, and decreased coordination. At this point, the benefits of early intervention may be lost, and the worker may require more involved interventions.

5. Headaches are another sign that an ergonomic hazard is present and a work site evaluation may be indicated. If left untreated it could possibly progress to more serious involvement of the neck or spine.